Before the
Federal Communications Commission
Washington, DC 20554

In the matter of	)	
	)	
Revision of Part 15 of the Commission's Rules	)	ET Docket 98-153
Regarding Ultra-Wideband Transmission	)	
Systems	)	

To: The Commission

REPLY TO OPPOSITION OF US GPS INDUSTRY COUNCIL

The Ground Penetrating Radar Service Providers Coalition ("GPR Providers") hereby replies to the Opposition filed by the US GPS Industry Council ("GPS Council") to its Petition for Partial Reconsideration. GPR Providers are a coalition of small businesses that have been providing safety-critical sub-surface testing services to both state and federal government agencies and private utilities, construction companies, and others for nearly three decades. As pointed out in its original Petition, the UWB Order[1], as originally adopted, would have serious deleterious effects on the GPR industry as well as on the thousands of private and governmental concerns who have come to rely on the services they provide. The Commission acted on July 12, 2002 to ameliorate the effect of the UWB Order on the existing GPR fleet by granting a blanket waiver permitting GPR use to continue. Revision of Part 15 Regarding Ultra-Wideband Transmission Systems, DA 02-1658, released July 12, 2002 (*"July 12 Order*"). That Order recognized that no harmful interference had been caused by operations of numerically limited and widely dispersed GPR units over the last quarter

[1]First Report and Order in ET Docket No. 98-153, 17 FCC Rcd 7435 (2002) ("UWB Order").

century. The *July 12 Order* therefore effectively preserved the status quo with respect to the existing fleet, while at the same time requiring GPR users to register with the FCC and coordinate their areas of planned operation. This timely action served to head off what loomed as a serious impairment to the safety applications now supplied primarily by GPR Providers.

INTRODUCTION

The GPR Providers had asked the Commission in their June 17 Petition to adjust the UWB Order insofar as it would have unintended or unnecessary adverse effects on the GPR industry. We asked the Commission: (a) to expand the range of authorized users of GPRs to include the entities who now actually provide these services, (b) to make the coordination process more manageable and more meaningful by focusing it on discretely defined geographic areas where there is legitimate concern, (c) to drop as unnecessary and counterproductive the "dead man's switch" requirement, and (d) to make the authorized emission levels for GPR equipment consistent with the levels for the far more numerous unintentional radiators who operate in the affected frequency bands. These adjustments would apply to the relatively small number of GPR devices (approximately a thousand at present) which will be used around the U.S. Although neither the GPS Council nor anyone else has been able to point to a single instance of deleterious interference caused by GPR operations in the past, the GPS Council objects without discrimination in almost knee-jerk fashion to every one of the adjustments to the original UWB Order proposed by GPR Providers.

In its introduction and summary, the GPS Council justifies its position by applying the following arguments to GPR: "existing radio stations would potentially be interfered with", it is a "latest new technology" with "lack of operations experience", GPR proponents envision a

technology which would be "widely available and ubiquitously deployed" with "potential millions of transmitters"; and public safety would be threatened.

Each of these arguments is individually false and inapplicable with reference to GPR.

With respect to potential interference, there is no evidence that GPR would interfere with any radio or GPS transmissions. GPR equipment has already been provided for testing and no measurable interference was found. The FCC and NTIA in testimony to Congress acknowledged that commercial GPR equipment has existed for more than 30 years with no reports of interference.[2] With respect to the "lack of operations experience," the successful 30 year track record of the GPR industry speaks for itself. With respect to wide availability and millions of transmitters, the GPR industry consists of some 300 specialized organizations which own, in aggregate, an estimated 1000 units. There is no evidence that this industry structure is likely to change drastically in the future. With respect to any threat to public safety, GPR is almost exclusively used for public safety. The only threat being posed is the potential loss or severe restriction of GPR as a valuable tool for public safety.

The GPS Council trumpets the fact that ". . . a high precision GPS system was used to pinpoint the drill site used to rescue the nine miners trapped in a collapsed Pennsylvania mine." GPS Council Petition at footnote 11. The occurrence of the disaster in the first place was due to a lack of information on the subsurface conditions. GPR providers are now being called upon by government agencies to help scan the walls of that exact mine for any other voids near the current workings ***in order to prevent the need for future such rescues!*** Had GPR technology

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[2]NTIA Report 01-383, p. 8-38 states "The signal from Device E was apparently below measurement system noise and Part 15 measurements could not be performed." From the description, Device E is a GPR.

been used *prior* to the cave-in, the entire disaster could have been avoided. It cannot be overemphasized that the use of GPR technology prevents disasters in a multitude of ways: by finding voids under pavements before cars fall into them, identifying bridge defects before the bridges collapse, locating underground pipelines before they are damaged by excavation, mapping moisture in railroad ballast before derailments occur, etc. Any process which unduly slows the ability of GPR providers to perform their tests makes it more likely that mine cave-ins of the sort pointed to by the GPS Council will occur.

The electromagnetic spectrum, especially the unlicensed electromagnetic spectrum, is a vast resource which is available to all of the people of the United States. While it must be managed so as to avoid conflicting uses, it is not, and cannot be, the private duchy of any one user or set of users. No one doubts that GPS services are useful and even critical to many, many different applications; indeed, as we have pointed out, many GPR applications rely on GPS use to identify and fix with precision the location of subsurface conditions which are suspect. Unfortunately, the GPS industry seems to have arrogated to itself the role of the anointed franchisee of the entire spectrum band allocated to GPS. Their attitude is that of benighted turn-of-the-century property owners who objected to airplanes flying over their land or building on the grounds that their air rights were unbounded. The GPS Council seems to believe that because their use of the spectrum was permitted first, all other use of that same spectrum is precluded -- regardless of whether there is any discernible effect on GPS. In reality, the most effective way to manage the spectrum is to accommodate all legitimate and worthwhile uses of the spectrum to the extent possible without investing any one spectrum use with a halo of untouchability. That said, let us examine each of the GPS Council's objections in turn.

I. EXPANSION OF ELIGIBLE USERS

The Commission's original formulation of eligible users of GPR technology seemed to restrict the class of users so severely that virtually all current users, including government agencies, would have been excluded. It now appears, based on the *July 12 Order*, that this was not the Commission's intent. Apparently the Commission intended the term "construction companies" to include the wide array of construction and maintenance-related activities which form the core of current GPR use. GPR Providers continue to believe that the definition in the rules should be modified so as to clearly incorporate the categories of users whom the Commission apparently intended to embrace. In this connection, we note that the definition of user eligibility we suggested in our Petition would exclude hobbyists, consumers and casual users of GPRs. We also note that no dramatic expansion of current users of GPRs is expected from a change in the eligibility definition. The industry has a relatively low growth rate, the equipment is expensive (and likely to become more so), and it appears that the Commission intended to authorize the same categories of users anyway. The proposed change in the rules would simply provide clarity for all concerned. The GPS Council offers no evidence whatsoever that such a change would greatly expand the number of GPR operators.

II. COORDINATION

In its Petition, the GPR Providers proposed a clarification or modification of the coordination scheme contemplated by the current rules. Because of the thousands of GPR applications which take place every week, it is unrealistic to believe that all of these can be pre-coordinated through NTIA on a case-by-case basis without the creation of an enormous bureaucratic infrastructure and all of the attendant processing delays. In the *July 12 Order*, the Commission took a significant step toward ameliorating the potential problem by clarifying that

coordination on a use-by-use basis is not required or expected. The approach suggested by GPR Providers was to have a one-time registration of users in their areas of present or future operations for which no further prior coordination would be required, coupled with a more specific coordination process in those rare cases where GPR use might raise interference concerns (such as in the immediate vicinity of airports or similar critical facilities). In this way, the resources of both NTIA and the GPR industry could be concentrated in the areas where the potential need is greatest.

The GPS Council's sole objection to this system of graduated and measured coordination is that it is "unduly complex" and incapable of addressing "real-time, for the moment concerns of safety service users." To the contrary, there was nothing complex at all about the proposed system. First, many GPR users will already have pre-registered and defined their service areas with NTIA under the blanket waiver process. Secondly, NTIA presumably already has a list of sites about which it has concerns against which it would check any prior coordination requests. The GPR Providers suggestion is simply to make that list public and limit specific pre-coordination to those discrete areas. Elimination of pre-coordination in the 99+% of the U.S. landmass where pre-coordination is wholly unnecessary would actually enhance attention to any "for the moment" conditions by permitting all concerned to focus on those rare cases while also eliminating cumbersome paperwork and additional bureaucratic manpower needs.

III. AUTOMATIC TURN-OFF SWITCH

Automatic turn-off switches, or "kill switches" are devices used with machinery and equipment which could be potentially dangerous. Once again, there is no evidence that GPR equipment could be potentially dangerous, so the shutoff concept really has no relevance. However, such a switch could compromise the operator's attention to the details of his or her

survey. Our initial petition for reconsideration clearly outlined the operational constraints for GPR operators and the potential interference of such a switch. Since many GPR operations are performed in construction sites and other potentially hazardous environments, this unnecessary attention to an unnecessary switch could of itself be hazardous to the operator and those working with him (or her). In other words, the proposed remedy is worse than the perceived problem.

IV. INCREASE IN AUTHORIZED EMISSION LEVELS

GPR Providers proposed that authorized emission levels be permitted to rise to Class B levels permitted for unintentional radiators under Part 15. The GPS Council argues that higher limits should be allowable for unintentional radiators (*e.g.*, personal computers) because "computer emissions can be readily cured at the source . . . ." Apparently the FCC has not sought to "cure" the emissions from PC's, even though these emissions exceed those produced by GPRs. This fact confirms that PC emission levels have not caused a problem to GPS systems. Given the millions of PC's currently emitting, individually, at a greater level than the few hundred extant GPR devices, it makes no sense to restrict GPRs to even lower emission levels. This argument forms the basis of the GPR Providers' proposal , which is founded on several reasonable bases. First, there is the fact that no harmful interference from GPRs has been predicted under any test approximating real world conditions. The GPS Council's statement that for GPR's to operate above 1 GHz, higher power would be required, is false. In fact, higher frequency GPRs which are commercially available operate at lower power. The GPS Council's statement, that "co-frequency operation of GPR devices and GPS is infeasible" is also false. Indeed, if the past twelve years of overlapping GPS/GPR use are a "real world" laboratory, these tests confirm quite convincingly that no deleterious effects can be expected. Many GPR operators use GPS as an integral part of their operation without any interference.

GPR Providers believe that the emission limits imposed by the Commission in the UWB Order failed to take into account not only this history but also the relative paucity of GPR devices vis a vis unlicensed consumer products and the unique ground-directed nature of GPR emissions. Far from "putting the cart before the horse," as suggested by GPS Council, GPR Providers anticipate that tests conducted by the Commission and NTIA in the next six months will confirm the absence of harmful interference, thus justifying relaxation of the emission limit. The change in the rules would follow that cart.

Indeed, GPR Providers conducted their own brief test in response to concerns raised by the E-911 community about the "lock-on" time for E-911 ALI functions. Our understanding is that the E-911 community was concerned that GPR operations in the proximity of a GPS unit might delay lock-on time to an unsatisfactory degree for public safety purposes. In response, a test conducted by a GPR firm indicated no measurable difference in the lock-on time for a GPS unit operating with no GPR unit nearby or at different distances from an operating GPR. See Attachment A for detailed results. While we do not claim that this test was exhaustive or conclusive, it certainly goes to show that the concerns of GPS users are factually unfounded and will be proven so if more extensive tests are conducted.

The GPS Council's insistence that unintentional radiations from GPR devices cannot be equated to unintentional radiations from computers is faulty. To be sure, the unintentional radiations from a computer are not necessary to the computer's intended function; we understand that. Our point is that the emissions of computers into the electromagnetic environment are far more extensive and wide-spread in the GPS band than anything which will ever come from GPRs, yet the authorized emission levels are vastly inconsistent. The fact remains that the unintentional radiations of GPRs – those which radiate from the side of the devise rather than

going into the earth as intended – are also unnecessary to the devices' intended operation. It is simply impossible to preclude all such emissions without compromising the integrity of the intended downward emissions.

In short, we are dealing with a relative handful of devices which radiate at very low power comparable to computers without any predicted adverse consequences whatsoever. Given these facts, it is impossible to justify power level constraints (in the above-960 MHz band) which differ from the Class B levels applicable to unintentional radiators.

V. CONCLUSION

For the reasons set forth above, GPR Service Providers urge the Commission to adopt the revisions to the UWB Order proposed in their June 17 Petition for Reconsideration.

Respectfully submitted,

GPR SERVICE PROVIDERS COALITION

By _____
Donald J. Evans

Fletcher, Heald & Hildreth, PLC
1300 North 17th Street, 11th Floor
Arlington, VA 22209
703-812-0400

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GPR and GPS Compatibility

GPR/GPS Lock-on Tests

- Test 1 – No GPR Signal
- Test 2 – GPR in normal use (directed at asphalt pavement, 12 feet from GPS)
- Test 3 – GPR in normal use (directed at asphalt pavement, 8 feet from)
- Test 4 – GPR 1.5 feet away, pointed directly at GPS (unrealistic)

Compatibility of GPR with GPS

- GPS Lock-in interference is primary concern to E911 systems
- Tests show that 1.5 GHz GPR has no impact on GPS lock-on

GPR/GPS Lock-on Test Results

Test 1

trial	TTFP (sec.)
1	33
2	33
3	33
4	33
Average	33
Sigma	0

Test 2

trial	TTFP (sec.)
1	33
2	34
3	33
4	33
Average	33.25
Sigma	0.5

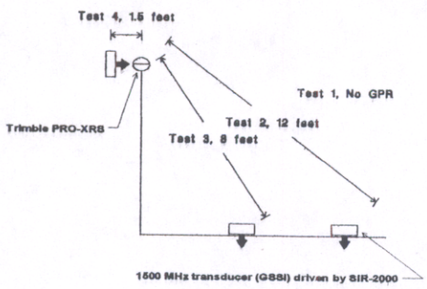
Test 3

trial	TTFP (sec.)
1	33
2	33
3	33
4	28
5	32
Average	31.8
Sigma	2.2

Test 4

trial	TTFP (sec.)
1	33
2	30
3	35
4	33
5	33
6	34
Average	33
Sigma	1.7

GPR/GPS Lock-on Test Layout



CERTIFICATE OF SERVICE

I, Deborah N. Lunt, a secretary for the law firm of Fletcher, Heald & Hildreth, P.L.C., hereby certify that a true copy of the foregoing REPLY TO OPPOSITION OF US GPS INDUSTRY COUNCIL was sent this 13st day of August, 2002, via first class, United States mail, postage prepaid to the attached Service List, except by hand delivery and e-mail as indicated.

Deborah N. Lunt

***Denotes Hand Delivery and E-mail**

SERVICE LIST

* Chairman Michael Powell
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

* Commissioner Kathleen Q. Abernathy
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

* Commissioner Michael J. Copps
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

* Commissioner Kevin J. Martin
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

* Peter A. Tenhula
Office of Chairman Powell
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

* Bryan Tramont
Office of Commissioner Abernathy
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

* Paul Margie, Office of Commissioner Copps
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

* Sam Feder, Office of Commissioner Martin
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

* Edmond J. Thomas, Chief, OET
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

* Julius P. Knapp, Deputy Chief, OET
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

* Bruce A. Franca, Deputy Chief, OET
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

* Michael J. Marcus
Associate Chief (Technology), OET
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

* Bruce A. Romano
Associate Chief (Legal), OET
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

* Lisa A. Gaisford, Chief of Staff, OET
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

* Geraldine A. Matise, Deputy Chief
Policy and Rules Division
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

* Ira R. Keltz, Deputy Chief
Policy and Rules Division
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

* Karen E. Rackley, Chief
Technical Rules Branch
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

** John A. Reed
Technical Rules Branch
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

* Ron Chase
Technical Rules Branch
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

J.R. Carbonell
Carol L. Tacker
David G. Richards
Cingular Wireless LLC
5565 Glenridge Conector
Suite 1700
Atlanta, GA 30342

Luisa L. Lancetti
Vice President, PCS Regulatory Affairs
Sprint Corporation
401 9th Street, N.W., Suite 400
Washington, D.C. 20004

Charles W. McKee, General Attorney
Scott Freiermuth, Attorney
Sprint Corporation
6450 Sprint Parkway
Mail Stop: KSOPHN0212-2A553
Overland Park, KS 66251

Dr. Samir S. Soliman
Vice President - Technology
QUALCOMM Incorporated
5775 Morehouse Drive
San Diego, CA 92121-1714

Dean R. Brenner
Crispin & Brenner, P.L.L.C.
1156 15th Street, N.W.
Suite 1105
Washington, D.C. 20005
Attorney for QUALCOMM Incorporated

Nicholas Allard
David M. Leive
Olivier P. Strauch
Latham & Watkins
555 11th Street, NW
Washington, D.C. 20004
Counsel for Sirius Satellite Radio, Inc.

Bruce D. Jacobs
David S. Konczal
Shaw Pittman LLP
2300 N Street NW
Washington, D.C. 20037
Counsel for XM Radio, Inc.

Multispectral Solutions, Inc.
20300 Century Boulevard
Germantown, MD 20874

Richard DalBello
Executive Director
Satellite Industry Association
255 Reinekers Lane
Suite 600
Alexandria, VA 22314

John C. Smith
General Counsel
Aeronautical Radio, Inc.
2551 Riva Road
Fifth Floor
MS 5-300
Annapolis, MD 21401

David A. Berg
Assistant General Counsel
Air Transport Association of America, Inc.
1301 Pennsylvania Avenue, N.W.
Suite 1100
Washington, D.C. 20004

Edward A. Yorkgitis, Jr.
Kelley Drye & Warren LLP
1200 Nineteenth Street, N.W.
Suite 500
Washington, D.C. 20036
Counsel for Aeronautical Radio, Inc. and Air Transport Association of America, Inc.

Ari Q. Firzgerald
David L. Martin
Hogan & Hartson, L.L.P.
555 13th Street, NW
Washington, D.C. 20004
Counsel to Siemens VDO Automotive AG

Alliance Law Group LLC
8614 Westwood Center Drive, Suite 450
Tysons Corner, VA 22182
Counsel for Kohler Co.

Lori S. Traweek
Senior-Vice President
Operations and Engineering
American Gas Association
400 N. Capitol Street, N.W.
Washington, D.C. 20001

Robert Cave
President
American Public Gas Association
11094-D Lee Highway, Suite 102
Fairfax, VA 22030-5014

Paul Withington
Vice-President
Time Domain Corporation
Cummings Research Park
7057 Old Madison Pike
Huntsville, AL 35806

Howard J. Symons
Sara F. Leibman
Tara M. Corvo
Angela F. Collins
Mintz, Levin, Cohn, Ferris, Glovsky and Popeo, PC
701 Pennsylvania Avenue, NW
Suite 900
Washington, DC 20004
Counsel to AT&T Wireless Services, Inc.

Douglas I. Brandon
Vice President-External Affairs
AT&T Wireless Services, Inc.
1150 Connecticut Avenue, NW
Washington, DC 20036

David P. Wye
Director, Spectrum Policy
AT&T Wireless Services, Inc.
1150 Connecticut Avenue, NW
Washington, DC 20036

Andrew Kreig
President
The Wireless Communications Association International, Inc.
1140 Connecticut Avenue, NW
Suite 801
Washington, DC 20036

Raul R. Rodriguez
Stephen D. Baruch
Philip A. Bonomo
Leventhal, Senter & Lerman P.L.L.C.
2000 K Street, NW
Suite 600
Washington, DC 20006
Counsel for U.S. GPS Industry Council

Ari Q. Fitzgerald
David L. Martin
Hogan & Haratson L.L.P.
555 13th Street, NW
Washington, DC 20004
Counsel for Short Range Automotive Radar Frequency Allocation Group